

# THE SIGMA ZETAN



Volume XLI

1972-1973



# THE SIGMA ZETAN

OFFICIAL ORGAN OF SIGMA ZETA



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## OUR NATIONAL PRESIDENT

**Sigma Zeta Members,**

As National President, I am expected to write a letter for publication in the Sigma Zetan. It is my honor to do so. However, I have put it off, waiting for some fantastic inspiration that would make this letter instill ambition, responsibility, and leadership into every member of our society. As you read you will note the results.

The past year has been a good one for Sigma Zeta. New chapters have been installed and existing chapters have shown new interest. I was pleased by the activity at the National Meeting. I urge all of you to make a sincere effort to participate in the National Meeting in 1973. If our organization is not improving it is deteriorating. We must all work to improve the quality of Sigma Zeta as well as increasing the quantity of members. We must not forget quality control while working on research and development. Just as people will not buy an inferior product, no matter how gloriously produced; there will be no need for Sigma Zeta if the quality of our organization does not meet our original high standards.

I am convinced that many of our problems in society today are caused by lack of communication. Let this not be our problem in our society and in our dealings with the outside world. I urge each chapter to communicate with me. Your communication will give input to your society. Do it now.

I would like to express my thanks to the Sigma Zeta staff members who have done an outstanding job this past year. I hope to see you at the 1973 National Meeting.

Sincerely,

Roger C. Splinter



The National Convention reelected all of Sigma Zeta's national officers for 1972-73. Above are Glenn Lipely, Vice President; Roger Splinter, President; Jim Drenan, Editor; Homer Paschall, Past President; and David Dautenhahn, Historian. Not shown is our hard-working National Recorder-Treasurer, Ken Cook.



Coffee break at the National Convention. How many of these delegates can you recognize?

Special honor awards were voted (motion by Chesnutt-Fleming) to three Ball State professors for their unparalleled local and national service:

Robert H. Cooper  
P. D. Edwards  
Donald E. Miller

A brief discussion of the travel allowance showed no sentiment for a change.

The possible use of the Development Fund was discussed. A motion (Seager-Paschall) was passed to present at the business meeting the idea of establishing Sigma Zeta undergraduate research grants. It was suggested that two \$100 grants might be appropriate with the current rate of income from the Fund.

The question of student membership on the National Council was raised, but no action was taken.

The charter fee was set at \$35 on a motion by Dautenhahn-Lipely. An honorary member fee was set at \$5, with the nominating chapter expected to pay the fee (Seager-Fleming).

Convention committees were named. The names of the student and faculty delegates appointed are listed in the convention minutes.

Professor Splinter suggested that a study be made of the possibility of supplying a pin with the initiation fee. He also proposed that we study a regional organization.

The Council agreed to order a national banner from Ihling Bros. Everard Co., Kalamazoo, Michigan.

The 1973 convention was set for Alpha Gamma Chapter, Malone College, Canton, Ohio. Psi and Alpha Omicron chapters asked for the next two conventions, 1974 and 1975. They will decide which date best suits the local calendars.

The meeting adjourned at 10:30 p.m. Fresh Chincoteague Oysters from Maryland were supplied courtesy of Professor Seager, to the enjoyment of most.

Present at the meeting:

Clarence Chesnutt (Alpha Omicron)  
Kenneth E. Cook (Upsilon - National Recorder-Treasurer)  
George Culbertson (Alpha Xi)  
Van Daniel (Alpha Xi)  
David I. Dautenhahn (Chi - National Historian)  
Duane E. Deal (Xi)  
James W. Drenan (Pi - National Editor)  
Fred Fleming (Beta)  
Ed Leslie (Chi)  
Glenn E. Lipely (Alpha Gamma - National Vice President)  
Homer D. Paschall (Xi - Past National President)  
Noble Roberts (Alpha Beta)  
Jack Seager (Anne Arundel Associate)  
Roger C. Splinter (Psi - National President)

## MINUTES OF THE FORTY-THIRD ANNUAL CONVENTION OF SIGMA ZETA

13, 14, 15, April 1972

The forty-third annual convention of Sigma Zeta Honorary Science Society was called to order by National President Roger C. Splinter at 9:07 a.m., in the Forum Room of the Student Center, Ball State University, Muncie, Indiana. Xi Chapter president Tom Gibson welcomed the delegates; he then introduced Dr. Dwayne N. Diedrich, assistant to the Dean of the College of Science and Humanities, who expressed the official welcome of Ball State University. Sigma Zeta National Vice President Glenn E. Lipely responded to the welcome.

Professor Splinter outlined the meeting format. The minutes of the forty-second meeting were approved (Seager-Leslie). The interim financial report was approved.

The installations of Alpha Omicron and Alpha Pi chapters were reported. The date for the installation of Alpha Rho Chapter at Stonehill College was given. The approval of Dakota Wesleyan University as Alpha Sigma Chapter was reported. The plaque used to record the newer chapters was shown.

Professor Splinter announced the following committee members:

Founders Cup Committee — Roger C. Splinter (National President), Kenneth E. Cook (National Recorder-Treasurer), and Tom Gibson (Xi Chapter President).

Auditing Committee — George Culbertson (Alpha Xi), Duane E. Deal (Xi), Donald Hughes (Alpha Omicron), Diane Vottero (Tau), and Eric Zurcher (Alpha Gamma).

Resolutions Committee — Fred Fleming (Beta), Noble Roberts (Alpha Beta), Paul Maher (Chi), Steve VanNorman (Upsilon), and Mike Woolridge (Pi).

Nominating Committee — Ed Leslie (Chi), Jack Seager (A<sub>3</sub>C), Gary Perdue (Alpha Xi), Anita Scott (Xi), and Laura Stuetzer (Psi).

National Editor James W. Drenan issued his annual pleas for materials to be put into the Sigma Zetan.

National Historian David I. Dautenhahn reported that he was keeping a scrap book of society activities, and that he needed material for that.

The proposal to use Development Fund money to provide research grants was announced. Other suggestions which arose during the discussion were: a travel allowance for seminars or study; a research journal for the exchange of ideas and independent study results; the improvement of communications between chapters.

The proposal to provide a key to all initiates found a favorable response. Professor Splinter was to pursue a feasibility study.

The purchase of a national banner was announced.

The following papers were introduced by Tom Gibson:

Diane Vottero (Tau) — Developing the Rationals as a Dense Order Field.

Mark E. Hansen and Jon Stratton (Psi) — Free Fall: Description and Mechanics.

Gary Perdue and Roger Williams (Alpha Xi) — Microbiological Examination of Selected Streams in South Western Wise County, Virginia.

James J. Hatcher (Alpha Xi) — Determination of Cadmium in Whole Blood.

James E. Edwards (Xi) — Thin-Layer Gel Filtration Techniques Developed for the Studies of Adenosin Deaminase in Human Tissues.

Robert A. Matthews (Chi) — Quantitative Elucidation of Radioactive <sup>113</sup>I in Relation to Tissues of Specific Organs From Laboratory Mice.

During the afternoon, interest area tours were taken to:

1. Research Facilities in Biology
2. Research Facilities in Chemistry
3. Research Facilities in Physics
4. Christy Woods
5. Medical Technology Program

6. Medical Education Program
7. Computer Center
8. Audio-Tutorial Response Labs

The Friday evening banquet was held in Cardinal Hall of the Student Center. Dr. Robert H. Cooper gave the invocation.

Professor Lipely presented Honor Awards to:

Richard Gregory (Rho) in absentia  
 Jim Hatcher (Alpha Xi)  
 Loren K. Hoffman (Beta)  
 Roger Janovsky (Psi) in absentia  
 Ronnie Morrison (Alpha Beta)  
 Joan Palsmeier (Alpha Delta)

Professor Paschall presented Honors Awards to:

Robert H. Cooper  
 P. D. Edwards  
 Donald E. Miller

Professor Cook presented the Founders Cup award to Psi Chapter; Janice Huhmann accepted for the chapter.

Professor Paschall recognized Xi Chapter alumni who were present.

Dr. Robert A. Featherstone, Xi Chapter president of 1940, gave a talk on what Sigma Zeta had meant to him as a student. He also told some of the work he has done since as a world-recognized authority in his area of work.

Dr. Donald E. Miller, who was retiring from teaching at Ball State University, reminisced about his experiences as a Sigma Zeta member.

The second session of the convention was called to order by National President Splinter at 9:00 a.m. Saturday morning. The following papers were introduced by Tom Gibson:

Sandra K. Satterfield (Xi) — A Cytogenetic Study of Rhoecol Discolor.

George A. Darr (Alpha Gamma) — Problems Encountered in Computerization of the Ohio State Fair Survey.

Ignatius Meimaris (Alpha Gamma) — Isolation of Melanosomes: Effects of Changing Isolation Conditions.

Michael D. Wooldridge (Pi) — Alizarine Red-S Staining Technique Used for Studying Bone Development in the Chick Embryo.

Bill Shipton (Pi) — Growth Studies in the Normal Developing Chick Embryo.

Ronald L. Morrison (Alpha Beta) — Absorption Spectra of Cadmium.

Donald Shroyer (Xi) — Studies on the Overwintering of the Northern House Mosquito, *Culex pipiens pipiens* L., in East Central Indiana.

The business meeting was called to order by Professor Splinter at 11:20 a.m. Professor Drenan listed these items for the Annual Report:

1. Chapter officers for current year.
2. Chapter officers for next year.
3. Chapter advisor(s).
4. Name and address of person to be contacted next fall.
5. Chapter activities for the **Sigma Zeta**.

The Development Fund was further discussed. Tom Gibson read a Xi Chapter proposal:

Let it be resolved that Sigma Zeta publish quarterly a newsletter with the intent that said newsletter be developed at some later date into a journal. The money for this publication shall come from the Development Fund income and the expenditure shall not exceed 90% of that income.

Pi Chapter submitted the following proposal:

The Pi Chapter supports the scholarship approach to the use of the Development Fund. The recipient of the award would be determined at the convention by majority vote of the members present. Those wishing to be considered

would be required to present a draft of their research proposal at the convention. The recipient of the award would be required to present a paper on his research at the following annual convention.

President Splinter appointed the following committee to report back by 15 May:

- Kenneth E. Cook (Upsilon)
- Franz A. deRoos (Alpha Omicron)
- Curtis Garrett (Xi)
- Paul Maher (Chi)
- Roger C. Splinter (Psi)

It was announced that Alpha Gamma Chapter, Malone College, would host the 1973 national convention, and that Psi and Alpha Omicron would be hosts in 1974 and in 1975, with the location to be decided between the two chapters.

Professor Cook read the roll call of chapters:

Chapter	Student Delegates	Faculty Delegates
Beta	2	1
Gamma	0	0
Delta	0	0
Epsilon	2	0
Zeta	0	0
Kappa	0	0
Lambda	0	0
Mu	0	0
Nu	0	0
Xi	13	6
Pi	6	3
Rho	3	1
Sigma	0	0
Tau	5	0
Upsilon	3	2
Phi	0	0
Chi	7	2
Psi	4	1
Omega	0	0

Chapter	Student Delegates	Faculty Delegates
Alpha Alpha	0	0
Alpha Beta	6	1
Alpha Gamma	8	3
Alpha Delta	2	0
Alpha Epsilon	3	3
Alpha Zeta	0	0
Alpha Eta	0	0
Anne Arundel Associate	0	1
Alpha Theta	0	0
Illinois Central Associate	0	0
Alpha Iota	0	0
Alpha Kappa	0	0
Alpha Lambda	0	0
Alpha Mu	0	0
Alpha Nu	0	0
Alpha Xi	3	2
Alpha Omicron	3	1
Alpha Pi	0	0

The roll call showed 97 delegates present from 16 chapters.

Eric Zurcher presented the Auditing Committee report that they had found the accounts to be complete and balanced. The report was accepted (Paschall-Dautenhahn).

The Resolutions Committee report was read by Paul Maher and was approved (Leslie-Hansen). The report was as follows:

The Resolutions Committee, on behalf of the visiting chapters of Sigma Zeta, wishes to express our gratitude to our host Xi Chapter of Ball State University for the opportunity of fellowship with them. Also, we especially want to thank Tom Gibson for doing a most capable job of chairing the convention. We would like to thank the University for the use of their facilities and their hospitalities at this 43rd annual Sigma Zeta convention.

We welcome and congratulate Baptist College at Charleston (Alpha Omicron) in Charleston, South Carolina and Trevecca Nazarene College (Alpha Pi) in Nashville, Tennessee.



Alpha Xi Chapter  
 George Culbertson  
 Van Daniel  
 James J. Hatcher  
 Gary Perdue  
 Roger Williams

Alpha Omicron Chapter  
 Clarence Chesnutt  
 Frans A. deRoos  
 Rebecca Faust  
 Donald Hughes

GUESTS AT DINNER

Mr. & Mrs. Gerald Alexander  
 Mrs. Ann Beuoy  
 Mr. Joseph Browning  
 Mr. & Mrs. George Brunner  
 Mrs. Paula Burton  
 Dr. and Mrs. Robert H. Cooper  
 Miss June Craig  
 Dr. & Mrs. Gerald Doeden  
 Dr. & Mrs. Richard Driskell  
 Dr. & Mrs. P. D. Edwards  
 Dr. Robert Featherstone  
 Mr. & Mrs. Brian Gibbs  
 Dr. & Mrs. Ray Henzlik  
 Mr. Richard Hyck  
 Dr. & Mrs. James List

Mrs. Sue McConnell  
 Dr. John Meiser  
 Mrs. Donald Miller  
 Dr. & Mrs. Jerry Nisbet  
 Mrs. Beverly Oliver  
 Dr. & Mrs. Homer Paschall  
 Dr. & Mrs. David Quinn  
 Miss Sandra Ratcliff  
 Mrs. Eileen Rathke  
 Dr. & Mrs. Gordon Rosene  
 Dr. Warren E. Schaller  
 Dr. Forrest Stevenson  
 Mrs. George Welker  
 Dr. Charles Wise  
 Dr. & Mrs. Harry Zimmack

SIGMA ZETA HONORARY SCIENCE SOCIETY

Financial Report: July 1, 1971 – June 30, 1972

Receipts

Membership fees:

Beta	\$ 35.00
Gamma	270.00
Delta	55.00
Epsilon	15.00
Zeta	117.00
Kappa	125.00
Lambda	70.00
Xi	355.00
Pi	115.00
Rho	20.00
Sigma	60.00
Tau	15.00
Chi	50.00
Psi	250.00
Omega	100.00
Alpha Beta	30.00
Alpha Gamma	110.00
Alpha Delta	45.00
Alpha Epsilon	40.00
Alpha Zeta	185.00
Alpha Eta	115.00
Anne Arundel Associate	35.00
Alpha Theta	38.00
Illinois Central Associate	20.00
Alpha Iota	100.00
Alpha Kappa	115.00
Alpha Lambda	35.00
Alpha Mu	65.00
Alpha Nu	10.00
Alpha Xi	65.00
Alpha Omicron	80.00
Alpha Pi	65.00
Alpha Rho	65.00
Alpha Sigma	45.00

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\$2915.00

Jewelry Sales:

Gamma	\$ 140.40
Epsilon	19.76
Alpha Zeta	116.60
Anne Arundel Associate	21.16
Alpha Iota	8.24
Alpha Lambda	52.58
	<hr/>
	\$ 358.74

Stationery Sales 18.50

Charter Applications: 105.00

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\$ 3397.24

**Disbursements**

Sigma Zetan printing	\$ 742.44
Jewelry	712.51
Chapter travel allowances	657.00
Chapter installations	505.59
History and Constitution printing	316.31
Charter printing	287.19
Officer travel allowances	266.84
Recorder-Treasurer office expenses	200.91
Editor office expenses	31.50
Refunds	20.00
	<hr/>
	\$ 3740.29

**SUMMARY**

Balance on hand, July 1, 1972	\$ 3988.28
Receipts as above	3397.24
	<hr/>
Total cash	\$ 7385.52
Disbursements as above	3740.29
	<hr/>
Balance on hand, June 30, 1972	\$ 3645.23
Balance in checking account	1645.23
Balance in savings account	2000.00
	<hr/>
Balance on hand, June 30, 1972	\$ 3645.23

**SIGMA ZETA DEVELOPMENT FUND**

Balance on hand, July 1, 1971	\$ 1607.20
Interest, September 30, 1971	49.63
Interest, December 31, 1971	50.32
Interest, March 31, 1972	51.01
Interest, June 30, 1972	51.72
	<hr/>
Balance on hand, June 30, 1972	\$ 1809.88

## ABSTRACTS OF STUDENT PAPERS

### PROBLEMS ENCOUNTERED IN COMPUTERIZING THE OHIO STATE FAIR SURVEY

by George Darr, Alpha Gamma

A survey of 3,147 people was taken at the Ohio State Fair. I constructed two computer programs which would 1) calculate the results of the survey, and 2) correlate the results of three questions with the rest of the survey.

The second program alone used eleven *do* loops (five being embedded) and four *go to* statements to replace a maximum of 3,316,345 individual steps. It also generated twenty-four pages of printout. The project spanned eight months; the results have been turned over to the Ohio Exposition Commission.

### FREE FALL: DESCRIPTION AND MECHANICS

by Mark Hansen and Jon Stratton, Psi

Our experiment was to measure the kinematics and dynamics of a free falling object with a large surface area versus its mass when released normal to the earth's surface. We wished to see how closely our data would compare to Newton's first, second, and third laws of motion.

The project involved two things. First, we needed to gather and interpret data from the test body and from time-exposed photographs of the test body in free fall. The reduced scale of the photographs necessitated processing measurements by correctional factors and equations to give us the final products of real distance, velocity, acceleration, and net force. Second came the visual analysis and representation of the parameters on graphs. This was where the actual comparisons between Newton's laws and our own experimental data took place.

Through the final correlation of data we found mathematical "limits" to Newton's laws of motion and to some kinematic relationships. The cause of such "limits" we believe to be related to the buoyant force of air. The project showed to us that any property of free fall depends heavily on the medium (air in our case), the mass, and the surface area of the falling object.

## QUANTITATIVE ELUCIDATION OF RADIOACTIVE $I^{131}$ IN RELATION TO TISSUES OF SPECIFIC ORGANS FROM LABORATORY MICE

by Robert A. Matthews, Chi

Since radiation and nuclear power will play a major role in tomorrow's energy sources, research studies are being conducted in the form of precautionary measures, protection against internal subjection, and treatment for prolonged exposure to radiation.

The purpose of my experiment was to identify the effects caused by the injection of  $I^{131}$  into laboratory mice. Mice were used because of their functional similarity to the human body. I injected five mice each with 0.46 microcuries of  $I^{131}$  and counted (scintillation counting) the heart, the lungs, the kidneys, the liver, the salivary and the thyroid glands of each mouse at intervals of 2, 12, 24, 48, and 72 hours. I also counted at the stated intervals a reference standard of the 0.46 microcurie sample of  $I^{131}$  and five pieces of filter paper soaked in a buffer to catch the urine and feces of the irradiated mice.

There was no radioactivity detected in either the heart or the lungs during the entire 72 hour period. Radioactivity was detected in the salivary and thyroid glands, the kidneys, and the liver.

Since iodine is one of the main elements maintaining the functioning of the thyroid gland, it is only reasonable that this gland would have radioactivity at a maximum. A maximum of 0.27 microcuries was reached at the 24 hour mark. The  $I^{131}$  was steadily absorbed by the thyroid up until the termination of the 24 hours. At this time, it appeared that too much iodide was present in the thyroid for normal functioning, so the absorption of the radioactive element declined throughout the remainder of the experiment. At the 24 hour mark, when the thyroid reached its maximum absorption, the kidneys began to absorb some of the  $I^{131}$ . A possible conclusion could be that the thyroid began eliminating the  $I^{131}$  in such a rapid pace into the blood stream that the kidneys could not eliminate the radioactive element in the urine and the remainder was absorbed in the tissues of the kidneys. The kidneys began to absorb the  $I^{131}$  and reached a maximum absorption of 0.11 microcuries at the 48 hour mark. It appeared that the liver then began to absorb the  $I^{131}$  until it absorbed 0.07 microcuries at the 72 hour mark. Since it is unlikely that the liver would store the  $I^{131}$ , it appears the  $I^{131}$  was forced into the renal arteries and on up into the hepatic artery and detected within the liver. Thus after 48

hours the absorption in the kidneys declined due to the increased absorption in the liver and the increase in excretion activity.

If these results are correct, then if  $^{131}\text{I}$  were internally injected by accident, the  $^{131}\text{I}$  could be pin-pointed in the body if the time of injection and the approximate dosage were known. The immediate treatment could be applied to that area of the body.

### ALIZARINE RED-S STAINING TECHNIQUE USED FOR STUDYING BONE DEVELOPMENT IN THE CHICK EMBRYO

by Michael Wooldridge, Pi

The purpose of this research was to study the development of bones in the chick embryo via a clearing and staining process. The process used for this study was the Alizarine red-S staining technique for tissues containing calcium. Excellent results were obtained through this technique; all calcium formed from intra-membranous and endo-perichondral ossification took up the stain. During the staining process, the embryos gradually cleared so that the end products were clear embryos with all calcium clearly visible.

The embryos were placed in several solutions of ethanol, sodium hydroxide, glycerol, and acetone for various lengths of time according to their size. This staining technique was a delicate step-by-step process, as the embryos had to remain in each successive solution until an osmotic balance between the embryo and solution was secured.

The resulting embryos were glass-clear with all ossification centers and developed bones exhibiting a color rich in red. The bones were then observed and measured for ossification centers and growth development. Magnified pictures were taken of each embryo for developmental studies in embryology.

### A CYTOGENETIC STUDY OF *RHOEO DISCOLOR*

by Sandra K. Satterfield, Xi

The monocot plant *Rhoeo discolor* is an ideal organism for cytogenetic research because of its low diploid chromosome number (12) and large chromosome size. All of its chromosomes are involved in translocations that result in an extremely atypical meiotic process with all chromosomes joined in a single ring or chain. *Rhoeo* flower buds fixed in Carnoy's

solution were dissected, and pollen mother cells were stained in acetocarmine and examined and photographed using a phase contrast microscope. Much of the data obtained from this project are contained in the Kodachrome slides which provide a complete photographic record of mitosis and meiosis in *Rhoeo discolor*. Meiotic cells reveal that non-disjunction or failure of proper chromosome separation at anaphase I of meiosis is not uncommon. The presence of lagging chromosomes is one evidence of atypical disjunction. As a consequence of the presence of multiple translocations and abnormal disjunction, many of the pollen grains formed in meiosis are defective and nonviable. Pollen viability was determined for five plants in the experimental population and found to range from 22 to 42 percent. The fact that meiosis in *Rhoeo* is atypical because of the presence of multiple translocations makes it especially interesting to study. *Rhoeo* could be used as a valuable aid for the teaching of meiosis and chromosome aberrations to high school or college biology students.

### GROWTH STUDIES IN THE CHICK EMBRYO

by Ed Bednar for William Shipton, Pi

This research project was conducted to study the growth rates of various regions of normally developing chick embryos. The study utilized chick embryos ranging from the eighth to the nineteenth day of incubation. The normal gestation period is twenty-one days.

Major bones of the skull and appendages were measured using a Vernier caliper. In order to calculate the mean values, standard deviations, variances, and the standard errors of the mean for each embryo utilized, a computer (programmed for basic language) was incorporated into the project.

Using these measurements, graphs and charts showing normal growth patterns were constructed. These graphs and charts exhibited the specific day of incubation on which several major bones of the skull and the appendages were initially recognized. From this point through day nineteen of incubation, growth rates of each of the bones was noted and recorded.

The curves resulting from these graphs were either linear or slightly parabolic in nature indicating that the development of the normal chick embryo is proportional to the days of incubation.

Further research in this area is planned for the near future. Hopefully, a study of the effects of certain compounds on the growth rate of the chick embryo can be implemented.

### STUDIES ON THE OVERWINTERING OF THE NORTHERN HOUSE MOSQUITO, *CULEX PIFIENS PIFIENS* L., IN EAST CENTRAL INDIANA

by Donald A. Shroyer, Xi

The northern house mosquito, *Culex pipiens pipiens* L., is an important vector of Saint Louis Encephalitis which overwinters in the adult form. The objectives of this study were: (1) to locate some hibernacula of *C. p. pipiens*, (2) to determine physiological histories of members of the overwintering populations, and (3) to study the resumption of feeding and reproductive processes in the overwintered mosquitoes in the spring.

The 13 hibernacula utilized in this study consisted of house crawlspaces, basements, road culverts, a cave, a coal bin, a pump house, and a canning factory. Relative humidity at these sites was high, typically in the 70% - 80% range. Hibernacula were warmer than the open air, though living mosquitoes were observed at sub-freezing temperatures.

As no males were observed in any overwintering site, spermatheca from samples of the female population at most sites were extracted and examined for evidence of insemination. Dissection of more than 173 females failed to reveal a single non-seminated mosquito. With few exceptions, the inseminated females contained motile sperm, even late in the overwintering period. Motile sperm were assumed to be viable.

By examination of the tracheolar system of the ovary and midgut, members of the overwintering populations were classified as being either parous (i.e., having previously deposited at least one cluster of eggs) or nulliparous. Of 169 mosquitoes dissected, 13 were parous. Since a blood meal is required for egg maturation (excepting auto-genous reproduction), the parous females were presumed to have taken blood meals, so they may serve as a winter reservoir of Saint Louis Encephalitis virus. Though inseminated, the typical overwintering *C. p. pipiens* was without bloodfeeding experience, and probably gained adulthood just prior to the onset of winter.

Overwintering mosquitoes placed under "summer" conditions (70°-80°F. and a photoperiod providing a 15-hour light phase) accepted both avian

and mammalian hosts after one to several days conditioning, despite the absence of feeding behavior in the hibernacula.

Behavior of the overwintered *C. p. pipiens* populations in early spring is now under study.

### MICROBIOLOGICAL ANALYSIS OF SELECTED STREAMS OF SOUTHWESTERN WISE COUNTY, VIRGINIA

by Gary Perdue and Roger L. Williams, Alpha Xi

The Powell River, which drains the southwestern part of Wise County in Southwest Virginia, was chosen as the site of investigations to determine the effects, if any, of its watersheds on the streams and tributaries. Reasons for selecting the Powell River were its close vicinity to the college and its five basically different watersheds: strip mined, deep mined, agricultural, populated, and unpopulated. Aerial photographs of the sheds were shown.

Quantitative analysis of the number of bacteria was used as an index of the effect of the watersheds on the streams. It was determined from viable plate counts that the bacterial populations of all the streams, except the undisturbed and unpopulated control stream, was in excess of the maximum allowable by the Public Health Service for the water to be considered safe.

To determine if the inhabitants of the watersheds were the source of the large number of bacteria present, tests for coliform and fecal streptococci bacteria were performed. A standard test to determine if the coliform were of human origin was also used. Results confirmed the presence of coliform and fecal streptococci and the source as human.

Genera of *Enterobacteriaceae* was then isolated and identified: *Escherichia*, *Enterobacter*, *Proteus*, and *Salmonella*. Since species of these four genera are known to cause diseases, particularly *Salmonella*, all pathogenic for man and/or animals, the harmful nature of the pollution is obvious.

It can be concluded from the research that the three streams draining inhabited, mined, or agricultural areas possess significantly larger populations of coliform and fecal streptococci bacteria than a pristine control stream. The specific effects of mining and agriculture on the bacteria population of the streams could not be clearly seen due to the

extreme degree of sewage pollution present. This research confirms that the bacterial population of a stream draining a watershed appears to reflect the activities present in the watershed.

### **CADMIUM: ITS QUANTITATIVE DETERMINATION AND RELATION TO PHYSIOLOGICAL MALFUNCTIONS**

by James J. Hatcher, Alpha Xi

Cadmium, in trace amounts, is found by atomic absorption spectroscopy, to be present in whole blood. Whole blood was digested by the method of Lehnert. The digestion process consists of wet-ashing the whole blood with nitric acid, sulfuric acid, perchloric acid and hydrogen peroxide. The residues are dissolved in 3 N HCl to a pH of 2.5 and chelated with ammonium pyrrolidine dithiocarbamate. The chelated complex is then extracted into methyl isobutyl ketone and measured by atomic absorption spectroscopy. Random samples of blood were obtained from Wise Appalachian Regional Hospital. The patients' medical records were reviewed for age, hypertension, anemia and respiratory diseases. The results suggest that possible correlations exist between cadmium concentration and physiological malfunctions such as hypertension. It is also believed that the cadmium may be ingested by cigarette smoking and bound to a cellular portion of whole blood.

### **SIGMA ZETA HONOR AWARD WINNERS**

Loren K. Hoffman

Beta

A senior chemistry major, Loren had a 3.60 overall average. He has been treasurer and vice-president of Beta chapter. He carried out an independent project in chemistry, on which he reported to the chapter.

Richard Gregory

Rho

Rick has been very active in the chapter and in the Science department. He was president of the sophomore class and of the Science Club and was instrumental in running the Science Fair. A chemistry major, he has received several departmental awards and was in charge of the lab assistants. He had an outstanding GPA.

Roger Janovsky

Psi

Roger has been an outstanding president of Psi Chapter, working hard and getting others to do the same. Under his leadership the chapter has been rejuvenated. A math major, he had a 3.31 GPA. He belonged to several other honoraries. He received the Good Citizenship Award from the city of Warrensburg for his work in the summer recreation programs.

Ronnie Morrison

Alpha Beta

Ronnie has been an industrious member for three years. In his senior year, when the chapter lost its president, Ronnie took his place. He has been an effective leader for two years in the regional Science Fair. Ronnie had a 3.3 GPA. He presented a paper on the cadmium spectrum to the National Convention.

Joan Palsmeier

Alpha Delta

Joan has consistently been an honors student at Sacred Heart College and has won the Scholastikon Award. She was secretary of Sigma Zeta and an officer in other scholastic groups. She wrote up a program on set theory which has been stored in the college library for use by other students. She "engineered" a high school Science Day and a Red Cross Blood Drive.

James Hatcher

Alpha Xi

Jim completed his degree requirements in three years and graduated with a 3.6 average. He was instrumental in organizing the chapter and was its first vice-president. This year he has been a most effective president. He presented a paper on cadmium blood at the National Convention. He has been active in many other campus groups. He has also worked part time at the Wise Hospital. He is now at the Medical School of the University of Virginia.

## CHAPTER REPORTS

### BETA (1926) - McKendree College, Leganon, Illinois 62254

Professors Fred Fleming and Porter, Advisors

	1971-72	1972-73
President	David McKenzie	Danett Utz
Vice-President	L. Kent Hoffman	Kian Chua
Secretary	Danett Utz	Carol Bopp
Treasurer	Danett Utz	Randi LaRussa

The chapter sponsored speakers in chemistry, physics, and ecology. Three members attended the National Convention. Seven new members were initiated.

### GAMMA (1927) - Medical College of Virginia, Richmond, Virginia 23219

Dr. Albert Zfass, Advisor

	1971-72
President	Richard Landau
Vice-President	Arthur L. Eiseman
Secretary	Maureen T. Herndon
Treasurer	Donald M. Day, Jr.

### DELTA (1927) - Northeast Missouri State College, Kirksville, Missouri 63501

Professor Eugene Smith, Advisor

	1971-72	1972-73
President	Paul Gray	Phil McClure
Vice-President	Lloyd Cleaver	Robert W. Ellis
Secretary	Rose Smith	Margaret Weber
Treasurer	H. Tyler Thornburg	Debby Humphrey

The chapter heard speakers from the college and the community. It co-sponsored a "Science Hall Picnic" in the Thousand Hills State Park. Twelve new members were inducted into the chapter.

**EPSILON (1929) - Otterbein College, Westerville, Ohio 43081**

Dr. Rexford Ogle and Professor Roger Wiley, Advisors

	1971-72	1972-73
President	Dennis Mammana	Patrice Perry
Vice-President	John Harvey	Mary Ann Ricard
Secretary	Rebecca Northrop	Sue Schuster
Treasurer	Kelvin Shiu	Keith DeWolf

Two delegates attended the National Convention. Four new members were initiated by the chapter.

**ZETA (1929) - Wisconsin State University, Stevens Point, Wisconsin 54481**

Professor Harry Smith, Advisor

Zeta inducted 29 new members.

**KAPPA (1936) - Western Illinois University, Macomb, Illinois 61455**

Dr. Gerald White, Advisor

Kappa Chapter got going again with the installation of 25 members.

**LAMBDA (1938) - Mansfield State College, Mansfield, Pennsylvania 16933**

Drs. Manley Powell, Charles Weed, and George Mullen, Advisors

	1971-72	1972-73
President	Ron Proko	Karen Brungard
Vice-President	Debra Ringler	Patricia Rice
Recorder	Robert Donaghue	Vicki Booth
Secretary	Patricia Rice	Ken Zeller
Treasurer	Robert Gruver	Susan Willow
Historian	Kay Staples	Sandra Mosch

A coffee hour for freshman majors, an open house for the new science Annex, and planetarium shows for area school children were among Lambda's activities. In addition, they held regular meetings and closed with a picnic at Dr. Mullen's farm. Fourteen new members were chosen.

**MU (1937) - Mankato State College, Mankato, Minnesota 56001**

Dr. Berton Weberg reports this chapter is temporarily inactive.

**NU (1937) - Northern Illinois University, DeKalb, Illinois 60115**

No report has been received from this chapter.

**XI (1938) - Ball State University, Muncie, Indiana 47306**

Dr. Homer Paschall, Advisor

	1971-72	1972-73
President	Tom Gibson	Steve Fermi
Vice-President	Linda Heedle	Curtis Garrett
Secretary	Vicki Atwell	Carole Parker
Treasurer	Sandy Satterfield	Anita Scott

As usual, Xi was one of our most active chapters. Besides the regular meetings, Xi made a strong effort to stimulate alumni interest. Four hundred news letters were mailed to alumni. Their donations permitted award of a research grant to Sandy Satterfield. She reported on it at the National Convention as did two other Xi members. Xi had a large number of alumni at the National Convention. Three former chapter advisors, Robert H. Cooper, P. D. Edwards, and Donald E. Miller, were recognized; the first two had also been National Presidents. The principal speaker, Dr. Robert A. Featherstone, was a Xi alumnus also.

The biggest activity of the year for Xi chapter was the sponsoring of the National Convention, at which they did their usual outstanding job. All of the delegates enjoyed the hospitality of the chapter and appreciated to some extent the hard work done by the members.

Xi initiated 51 members into its chapter.

**PI (1943) - Millikin University, Decatur, Illinois 62522**

Drs. James Drenan and Neil Baird, Advisors



	1971-72	1972-73
President	Rosemary Lawton	Mike Wooldridge
Vice President	Mary Ann Lee	Warren Jeseck
Secretary	David Glasscock	Janet Rodeffer
Treasurer	Paul Abramson	Richard Felshaw

Pi's activities included a nature hike, a field trip and sponsoring movies in addition to regular speakers. Members were active in collection of paper, bottles, and cans for recycling. The year closed with the annual picnic. Eight members attended the National Convention where two gave papers. Twenty-three new members were chosen.

**RHO (1943) - Indiana Central College, Indianapolis, Indiana 46227**

Dr. Edward Vondrak, Advisor

	1971-72	1972-73
President	Norman Beets	Norman Beets
Vice President	Richard Gregory	Dean Felker
Secretary-Treasurer	Neal Ramsey	Sue Dumm

Several members served as judges at high school science fairs. Four attended the National Convention. Four new members were elected.

**SIGMA (1944) - Our Lady of the Lake College, San Antonio, Texas 78207**

Twelve new members were initiated.

**TAU (1947) - East Stroudsburg State College, East Stroudsburg, Pa. 18360**

Dr. Charles Maclay, Advisor

Five students attended the National Convention, and one of them presented a paper. Three new members were installed.

**UPSILON (1948) - Anderson College, Anderson, Indiana 46011**

Dr. Charles Miller, Advisor

	1971-72	1972-73
President	Steve Van Norman	
Vice President	David Doty	
Secretary	Ruth Crose	
Treasurer	Tim Hobbs	

Five delegates represented Upsilon at the National Convention. Several new members were chosen.

**PHI (1948) - Eureka College, Eureka, Illinois 61530**

Professor George Vlahos, Advisor

	1971-72	1972-73
President	Pamela Shragel	
Vice President	Mary Mezo	
Secretary	Janet Coney	
Treasurer	Stanley Leesman	

**CHI (1951) - Missouri Valley College, Marshall, Missouri 65340**

Professors David Dautenhahn and C. E. Leslie, Advisors

	1971-72	1972-73
President	Paul Maher	William Davis
Vice President	Don Corley	Rodney Ford
Secretary	Jacline Huber	Diana Elliott
Treasurer	Jacline Huber	Diana Elliott

Nine members were at the National Convention. Ten new members were initiated.

**PSI (1956) - Central Missouri State College, Warrensburg, Missouri 64093**

Drs. Roger Splinter and Joseph Snoble, Advisors

	1971-72	1972-73
President	Roger Janovsky	Mark Hansen
Vice President	Janet Barnes	Janice Huhmann
Secretary	Janice Huhmann	Cynthia Whithaus

	1971-72	1972-73
Treasurer	Laura Stuetzer	Nancy Barrow
Historian	Marilyn Evans	Elaine Aholt

Psi Chapter was very active. It coordinated the activities of all science and math groups on campus and started a newsletter. It wrote and passed a chapter constitution. Psi set up a bulletin board and a display case to publicize its activities. Members decorated the science building at Christmas.

During vacations, members visited their hometown college to interest them in forming new chapters. Several colleges displayed some interest.

Psi members gave demonstrations at several local schools, held two banquets, a reception and a bake sale. Fifty new members were chosen, and five attended the National Convention. For its diverse activities, Psi chapter was awarded the Founders Cup as the most active chapter of the 1971-72 year.

**OMEGA (1961) - Frostburg State College, Frostburg, Maryland 21532**

Drs. Paul Hunt and Arthur Olah, Advisors

	1971-72
President	C. Edward Gasque
Vice President	Linda Crawzyck
Secretary	Patricia Eaton
Treasurer	Nelson Palmer

Twenty new members were initiated into Omega chapter.

**ALPHA BETA (1963) - Campbellville College, Campbellville, Ky. 42718**

Miss Beatrice Evans, Advisor

	1971-72	1972-73
President	Ken Keltner	Mark Owenby
Vice President	Ronnie Morrison	Ricky Rowe
Secretary	Ray England	Helen Poynter
Treasurer	Martha Meyer	Nancy Wise

The chapter administered the Central Kentucky science fair and made money on concessions to help send delegates to the National Convention; seven delegates attended that convention. Six new members were initiated at the annual banquet.

**ALPHA GAMMA (1969) - Malone College Canton, Ohio 44709**

Professors Glen Lipely and Marvin Stephens, Advisors

	1971-72	1972-73
President	Sandy Goehring	Eric Zurcher
Vice President	Eric Zurcher	Charles Ropp

	1971-72	1972-73
Secretary	Marty Vaughan	Marty Vaughan
Treasurer	Louise Kaufman	J. Timothy Bricker

Twenty-one new members were initiated at the fall banquet. Members were active in ecology, recycling cans, making films and acting as resource leaders in the December Term Ecology Program. Members acted as tutors in biology and math and helped with local science fairs. Eleven members attended the National Convention, at which two of them presented papers.

**ALPHA DELTA (1969) - Sacred Heart College, Wichita, Kansas 67213**

Sister Therese Wetta, Advisor

	1971-72	1972-73
President	Richard Marney	Larry Hund
Vice President	Sister Susan Welsby	Sister Susan Welsby
Secretary - Treasurer	Joan Palsmeier	Joan Palsmeier

Members sponsored a high school Science Day. Two members won Scholastikon awards, one for a study on the water environment of Wichita and one for a group of tapes and slides on set theory. They established a tutoring service in science and math, sponsored a Red Cross Bloodmobile visit, two college dances, and the International Festival. Two member attended the National Convention. Nine new members were initiated.

**ALPHA LAMBDA (1970) - Suffolk University, Boston, Massachusetts 02114**

Dr. Maria Bonaventura, Advisor

	1971-72	1972-73
President	Susan B. Cohen	Brian Lightbody
Vice President	Marianne Reese	Denise Runge
Secretary	Dr. Bonaventura	Dr. Bonaventura
Treasurer	Dr. Beatrice Snow	Dr. Beatrice Snow

The chapter revised its constitution so sophomores could be admitted. Jointly with the Science Club, it sponsored talks on submarines and photography, and participated in Earth Week. Ten new members were inducted.

**ALPHA MU (1971) - Immaculata College, Immaculata, Pennsylvania 19345**

Sister Ann Immaculata and Sister Maria Socorro, Advisors

	1971-72	1972-73
President	Patricia Bomba	Ruth Rizzo
Vice President	Anita Maginn	Lucy Grabowski
Secretary	Stephanie Slawinski	Anne Capista
Treasurer	Sandra Freeman	Barbara Knauss

Alpha Mu drew up a constitution and heard several talks on ecology. They helped sponsor a Science Bowl for high school students. Nine faculty and 12 students were initiated.

**ALPHA NU (1971) - Oglethorpe College, Atlanta, Georgia 30319**

Dr. Thomas Key, Advisor

	1971-72
President	Gary Sanders
Vice President	Mary Ezzell
Secretary	Robert Allen
Treasurer	Steve L. Wilson

Two new members were chosen.

**ALPHA XI (1971) - Clinch Valley College, Wise, Virginia 24293**

George Culbertson, Wayne Edwards and Van Daniel III, Advisors

	1971-72	1972-73
President	Jim Hatcher	Jewell Yates
Vice President	Roger Williams	Buford Eldridge
Secretary	Rita Dotson	Vicki Galloway
Treasurer	Rita Dotson	Judy Dickenson

One of our most active new chapters, Alpha Xi sponsored a high school Math-Science Competition for 17 area high schools and raised from area businessmen \$1,350, which was awarded to the winners. Members also helped at the regional Science Fair and inducted 13 new members. Five attended the National Convention.

**ALPHA OMICRON (1971) - Baptist College, Charleston, S. Carolina 29411**

Dr. Clarence Chestnutt and Professor Fred Worthy, Advisors

Alpha Omicron chapter was installed on November 12, 1972 at a dinner meeting at the home of Dr. Chestnutt. The science faculty was represented by Dr. J. M. Verrier, A. K. Bonnette, R. L. Carroll and Professors S. A. Nemeth and F. L. Worthy. National President Roger Splinter and Dr. Chestnutt then initiated Linda M. Blanton, Elizabeth Anne Brown, Steven M. Cremer, Rebecca J. Faust, Michael W. Guess, Pamela L. Lamb,

**ANNE ARUNDEL ASSOCIATE CHAPTER (1970) - Anne Arundel  
Community College, Arnold, Maryland 21012**

Seven new initiates were inducted. Dr. Seager attended the National Convention.

**ILLINOIS CENTRAL ASSOCIATE CHAPTER (1970) - Illinois Central  
College, East Peoria, Illinois 61611**

R. S. Dunham and Stan Rose, Advisors

Four new members were chosen. Officers will be elected in the fall.

**THE EDITOR COMMENTS**

"Toward a more open and better integrated society" — does that sound familiar? That's my desire for Sigma Zeta.

Our society has grown rapidly in size and in geographical range; have our governing methods kept up with this growth? When we had only a few chapters fairly close together our problems could be solved by delegates meeting at the National Convention or by the National Council between conventions. But now a chapter may, for several years in a row, find itself unable to send delegates to a distant convention. Those delegates who do attend are often unaware of issues that will be brought up at the meeting; consequently they do not have enough time for full consideration of the issues.

Our chapters have been almost completely independent. Few chapters are aware of what other chapters are doing or planning. Some are apparently unaware of changes in our National Constitution, or that other chapters are in need of help. Some feel very isolated.

To deal with these problems we might consider the following suggestions:

1. A specific time could be set aside at the convention for discussion of business, particularly by the student delegates, so that they can act positively at our business meetings.
2. A specific time could be available at the convention for chapters to report to other chapters on their activities and problems. After listening to these reports, the delegates might be given a voice in the awarding of the Founders Cup.
3. Chapters who plan to raise questions or issues at the convention could communicate with other chapters before the convention so that their delegates would be better able to represent each chapter's views.
4. The issue of student members on the National Council has been raised. I think a representative from each of the chapters planning to host the next two conventions could be helpful, both for the society and for the conventions.
5. Nearby chapters might plan joint meetings once a year to exchange ideas and maintain interest.

6. Representatives selected by the National Council might try to visit all chapters in their regions perhaps once in two years.

7. Replace our yearly journal with quarterly mimeographed reports. The expense would be similar, and more frequent reports might increase our ability to communicate with each other. Research projects not completed at convention time could be reported when finished.

These suggestions are all tentative, and some are probably unworkable. Some might require changes in the National Constitution. I hope they will provoke discussions in your chapter and that you will convey your ideas to me or to others on the National Council. As a result of years at this job, I believe poor communication is our biggest problem. What do you think?